MONTANA FISH, WILDLIFE & PARKS
HUNTING SEASON / QUOTA CHANGE SUPPORTING INFORMATION

Species: Mountain Lion
Region: 4
Deer/Elk Hunting District: 422, 423, 424, 425 & 442
Year: 2020/2021

1. **Describe the proposed season / quotas changes and provide a summary of prior history (i.e., prior history of permits, season types, etc.). REMEMBER THIS STEP IS TO BE ACCOMPLISHED BY THE INITIAL ENTRY INTO THE DATABASE—SO FOLKS CAN START THIS NARRATIVE WITH #2 BELOW.**

Decrease the male mountain lion quota from 8 to 7 and maintain the female quota at 5. Overall, this would reduce the total potential lion harvest from 13 to 12 for this lion management unit (LMU). The proposed quota reduction for male mountain lions in this LMU as been utilized before as recently as 2008-2010 period. Over the last 24 years, the total lion harvest quota has ranged from a peak of 29 (1998-1999 period) to a low of 9 (2008-2010 period). During the 24-year period, peak actual harvest obtained occurred during the 1998/1999 period (n=29 lions) with lowest harvest totals coming in 2004 (n=6). Current mountain lion harvest season types have been in place during the duration of the latter periods. Through the 2014 season, the male harvest quota had been met or exceeded 8 out of the previous 9 years, despite a gradual increase in the quota (the last increase taking place in 2014). Beginning in 2015, the male quota has not been met 4 out of the last 5 years (Table 1). The female quota has been met or exceeded for 17 straight years, although female quota levels have remained at low levels during this period. When filled, male quotas have typically been met by mid-February and female quotas have been filled in December or early January. There have also been occasion's in the last few years in which lions are harvested during the fall season (without dogs). See Table 1 and Figure 1 for summary of quota levels and harvest information for at least the last 10 years.

Existing Season:

HDs 422, 423, 424, 425 & 442
General Lion License.
Harvest Quota: Female quota = 5 and Male quota = 8.

- Sept 02 – Oct 15 – Archery Only Season.
- Oct 20 – Nov 26 – Fall Season.
- Dec 01 – Apr 14 – Winter Season.

Proposed Season:

HDs 422, 423, 424, 425 & 442
General Lion License.
Harvest Quota: Female quota = 5 and Male quota = 7.

- Sept 05 – Oct 18 – Archery Only Season.
- Oct 24 – Nov 29 – Fall Season.
- Dec 01 – Apr 14 – Winter Season.

Table 1. 10-year harvest summary for Lion Management Unit 422, 423, 424, 425, 442.

Season Year	Male Quota	Female Quota	Total Quota	Male Harvest	Female Harvest	Total Harvest	% Male Q. Filled	% Female Q. Filled	% Total Q. Filled	Season Closure Date
2019*	8	5	13	6	5	11	75	100	84.6	M still open F closed 1/19/20
2018	8	5	13	8	5	13	100	100	100	M closed 1/10/19 F closed 2/7/19
2017	8	5	13	6	5	11	75	100	84.6	M did not close F closed 2/19/18
2016	11	4	15	9	4	13	81.81	100	86.7	M did not close F closed 12/14/16
2015	11	4	15	7	5	12	63.63	125	80	M did not close F closed 12/21/15
2014	11	4	15	11	5	16	100.00	125	106.7	M closed 2/5/15 F closed 12/27/14
2013	9	3	12	10	3	13	111	100	108	M closed 1/17/14 F closed 12/25/14
2012	9	3	12	9	4	13	100	133.3	108.3	M closed 2/3/13 F closed 1/15/13
2011	9	3	12	9	5	14	100	166.7	116.7	M closed 2/13/12 F closed 1/13/12
2010	7	2	9	10	2	12	143	100	133	M closed 12/20/10 F closed 12/17/10

* 2019 license year harvest as of April 5.

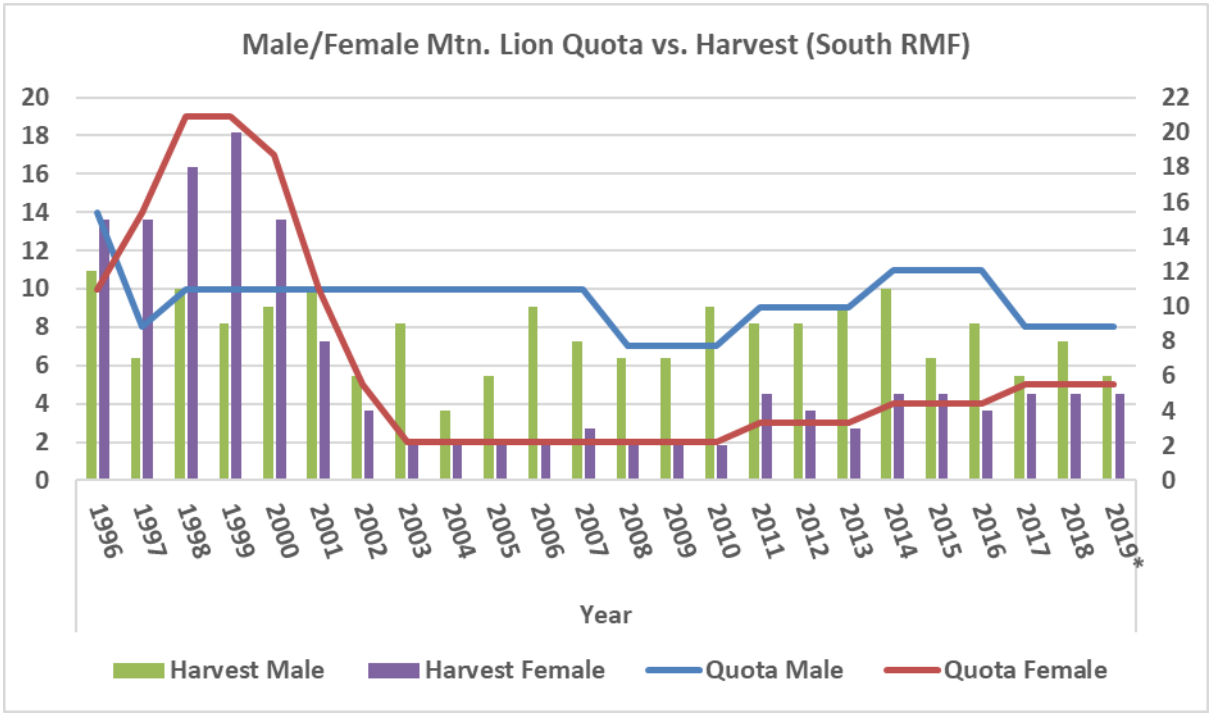

Figure 1. Mountain lion hunting quota's vs harvest by gender for lion management unit 422, 423, 424, 425 and 442.

2. **What is the objective of this proposed change? This could be a specific harvest amount or resulting population level or number of game damage complaints, etc.**

The objective of this minor proposed change serves a couple primary roles. However, it is worth mentioning this proposed change is likely the last proposed modification of lion quota levels for this LMU before full implementation of the recently adopted MT mountain lion monitoring and management strategy (MFWP, 2019). The strategy is designed to provide systematically collected, robust data to improve and inform population modeling efforts which can then be used to more confidently prescribe harvest quotas across ecoregions (MFWP, 2019).

Part of this justification serves to further align male and female quota levels with respect to 'normal' sex ratios in lion populations. For *adult* lions, Robinson and DeSimone (2011) calculated in their west central Montana study that males constituted 29% of the population and females 71%. Other data portrays adult lion sex ratios of approximately 40% and 60% for males and females, respectively. For several years, female quota levels comprised a relatively small proportion of the total harvest due in large part due to concerns of overharvesting females and longer-term effects on overall lion populations. Given the size of the LMU with respect to harvest distribution and assumed female home range size, maintaining the female quota level at 5 and decreasing the male quota to 7 at least to some degree gets closer to actual sex ratios. Balancing the harvest quota sex ratio with concerns over harvest of females is an ongoing challenge. Implementation of the newly adopted state mountain lion monitoring and management strategy soon may help to further justify quota's and potential harvest closer to actual sex ratios observed on the ground.

In 2017 and in part due to concerns over high quota level impacts on mountain lions, a reduction in the male quota took place and has been maintained (n=11 reduced to n=8). At the same time an increase in the female quota was adopted (n=4 increased to 5). Despite the latter male quota reduction, the quota has not been met two out of the last three seasons (including this current season that's technically still open), or now 4 out of the last 5 years. In general, weather conditions have been such to allow for reasonably good lion hunting and/or tracking opportunity at least these last 3 years. A reduction in this male quota by 1 lion should help to alleviate some concerns over harvest impacts on at least male lions. Average actual male harvest obtained during the last 5-year period is 7.

3. **How will the success of this proposal be measured? This could be annual game or harvest surveys, game damage complaints, etc.**

Success of this proposal will be measured by various harvest data, newly adopted population monitoring techniques (to be implemented), general public (hunter/houndsmen) satisfaction and to some limited degree, big game prey species performance (recruitment/survivorship).

Age data from tooth cementum analysis of lions in this LMU over the last several years indicates general maintenance in overall harvested lion ages. It's also important to note that there's always some level of teeth not collected so age data is not based on 100% of the actual number of lions harvested. Average male lion age from license years 2007-2013 was 3.4 years. Adding age data to that dataset through the 2019 gives way to an average of 3.3 years. Average female age from 2007-2013 was 3.8 years. Adding age data to that dataset through the 2019 gives way to the same average of 3.8 years. At least maintenance of these average ages would be expected to be sustained with current quota levels.

Keeping tabs on harvest distribution as a whole or between sexes is also important. Distribution of harvest these last few winters is different than 'traditional' harvest locations. Over the last five years, just over half the entire female harvest has come from HD 423 (13 of the 24 females harvested). Over that same period, one third of all males harvested have come from that same area. Prior to these last 5 years, most harvest had come from areas further north (HDs 422, 424, and 442). For these last few years, this has taken away from potential harvest that could occur further to the north within this LMU and does provide some further justification that impacts to lions in at least this northern area is generally low. There are also significant areas in which little to no lion hunting occurs within this LMU which serves as emigration sources to those areas that have heavier hunting harvest. See Figure 2 and 3 for further information on harvest distribution in recent years.

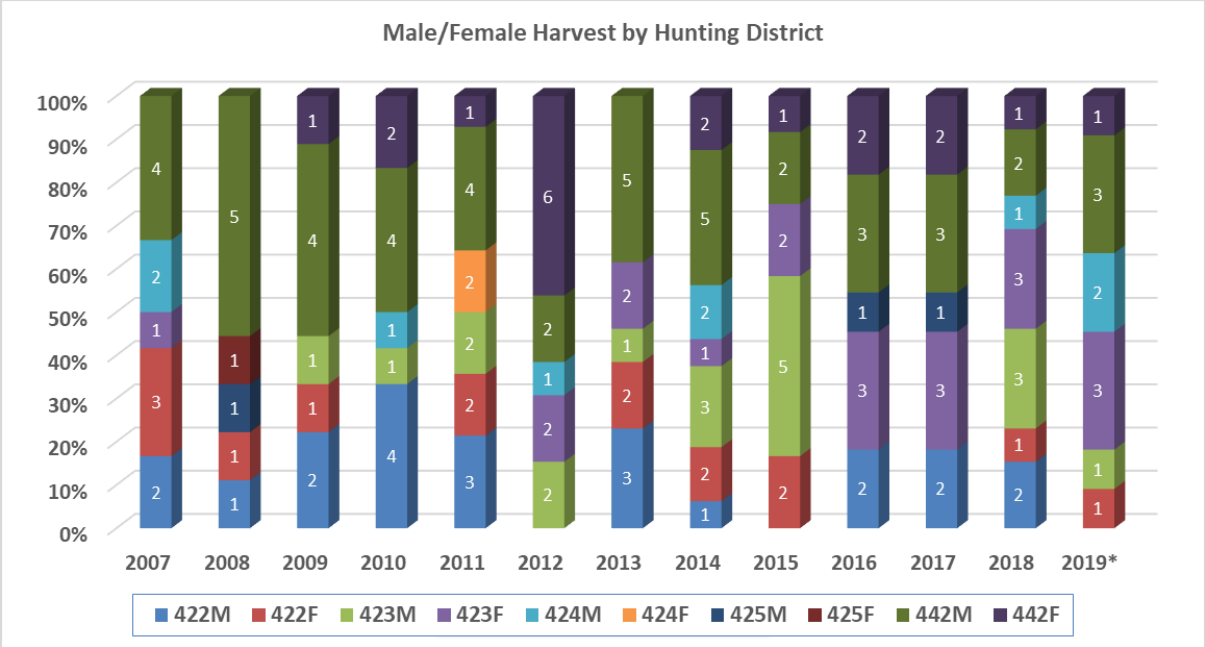

Figure 2. Mountain lion harvest by gender and hunting district for lion management unit 422, 423, 424, 425 and 442.

There are also some concerns of the impact of predation (to include lions) may be having on local facets of big game populations, although data backing this is limited. The southern Rocky Mtn. Front continues to show longer-term observed and maintained reduction with certain big game species (e.g., low calf recruitment in elk and low overall observed mule deer numbers compared to historical potential), although predation is just one of the potential contributing factors, depending on the species. More specifically, mountain lion predation effects on the latter are likely not the primary driving factor with respect to the latter declines. However, there is some concern that proper or increased predator management (to include lions) may play one important role with respect to big game species recovery over time. This proposed reduction in the male quota by one is counter to this argument, but should have generally negligible effects on local big game populations as a whole. For a more local perspective, of 56 mountain lion kills examined by Williams (1992) in the Sun River area, deer (mule and white-tailed deer), elk and bighorn sheep accounted for 41%, 27% and 18%, respectively. More recent, the near complete mule deer research project on the southern RMF showed predation

being the number one cause of mortality for adult does. Eight of the 14 known causes of mortality were classified as predation and further, 5 of those 8 being deduced as mountain lion (unpublished data). Other factors that may be contributing to the reduced big game numbers noted above may include weather, habitat influences, disease (BH sheep), interspecific competition and hunting.

Lastly and as previously noted, the mountain lion monitoring and management strategy will also in time help provide further provide direction to help confirm or change current lion quota recommendations with respect to lion population estimates.

4. What is the current population's status in relation to the management objectives? (i.e., state management objectives from management plan if applicable; provide current and prior years of population survey, harvest, or other pertinent information).

There is currently no official population management objective for mountain lions in this LMU. This is in large part due to the lack of good techniques currently available to get reliable estimates of mountain lion populations without spending significant time and money – although again, this will change in the coming years given the new Strategy and should significantly improve our knowledge base related to this. In the meantime, Robinson et al. (2013) made an attempt to gauge population estimates based off of statewide research data, generally accepted lion population information, habitat influences and harvest data. Using some of this information along with looking at density estimates based on other research there is some potential to gain rough estimates of population size for this LMU and subsequent effects of harvest on local area populations. It is important to realize that such estimates come with some level of variability since research completed elsewhere may not correlate the same to another area/habitat.

Looking at where mountain lions have been harvested in the past and overlaying potential mountain lion habitat based on vegetation and topography with mule deer and elk winter range information in the hunting districts, it is estimated that there may be conservatively 720 km² of potential winter mountain lion habitat in the LMU. Based on published mountain lion research done elsewhere in Montana and the western United States and Canada, it appears that a total mountain lion density of 8-10 lions/160 km² of winter lion habitat is reasonable for this area. Research also indicates that in hunted populations approximately 50% of the population may be made up of adults and approximately 50% of the population may be comprised of sub-adults, yearlings, and kittens. Using a potential mountain lion density of 8 lions/160 km² of habitat would yield an estimate of approximately 36 total lions in the LMU, while using a density estimate of 10 lions/160 km² of habitat would yield an estimate of approximately 45 lions. Current research indicates that mountain lion populations can withstand harvest rates of approximately 20-30% of the total population without substantial decrease in at least local populations (amount of emigration from other areas also plays a key role) . If the research based estimates of approximately 36-45 total mountain lions in the LMU is close to accurate, then the new proposed total quota of 12 (7M, 5F) and if the respective quota's are actually met through harvest, would result in a harvest rate ranging from 27%-33% of the entire population. At those conservative harvest rates population maintenance (at most) could be expected, however, additional lion emigration likely occurs in this area which also has influence on the population as a whole.

Other published mountain lion research conducted elsewhere in Montana and in Wyoming indicates that winter home range sizes of approximately 80-120 km² for males and 35-40 km² for

females is reasonable to assume. Williams (1992) calculated home range sizes in the Sun River area at approximately 96 km² for males and 58 km² for females. Using the estimated potential winter mountain lion habitat (720 km²) in this LMU, one comes up with an estimated 6-9 resident adult males and 18-25 resident adult females for the LMU or 24-34 resident adults total (doesn't account for overlap in home ranges, which is common particularly among females). Applying the idea from above that adults may comprise approximately 50% of a hunted mountain lion population would yield a total population estimate of 48-68 lions. Robinson et al. (2013) estimated lion carrying capacity in this LMU at 54 lions. Using a total harvest quota of 12 lions (7 males and 5 females) and assuming population growth remains the same and harvest is representative within available habitat, this would then result in a harvest rate of approximately 18-25%. With this harvest rate, one could expect overall population maintenance as/if harvest does meet the quota levels. Further, recent adult female harvest for this LMU is within acceptable adult female harvest rates before seeing potential local population level impacts. Cautions must be used when trying to apply mountain lion densities and home range sizes to areas other than where the research was completed. Mountain lion densities and home range sizes could be smaller or greater than the numbers used above, which would of course impact population estimates.

Additional harvest information for this LMU comprised of HD's 422, 423, 424, 425 and 442 is provided in Table 1 and Figures 1-3.

5. Provide information related to any weather/habitat factors that have relevance to this change (i.e., habitat security, hunter access, vegetation surveys, weather index, snow conditions, temperature / precipitation information).

Lion habitat in the area is believed to be good to excellent with generally good number of prey consisting of mule deer, white-tailed deer, elk and bighorn sheep among big game species. Access in these hunting districts for mountain lion hunting is good, with some restrictions due to the low density of publicly accessible roads in the area. These limited access areas along with high use areas may also cause certain areas to portray source/sink population dynamics. The limited accessibility of much of the area to lion hunters could also be one of the primary reasons that mountain lion harvest in these hunting districts has at times historically been somewhat low.

Weather conditions can negatively affect mountain lion harvest, however, it is believed that weather conditions the last few years have afforded lion hunters ample opportunity to harvest available mountain lions. Other considerations and concerns about lion presence in "nontraditional" habitats or in those environments where tolerance for lions is very low (cities, towns, subdivisions, etc) has influenced quota numbers in the past. There are some concerns of lion activity in/around these "nontraditional" habitats.

6. Briefly describe the contacts you have made with individual sportsmen or landowners, public groups or organizations regarding this proposal and indicate their comments (both pro and con).

Limited comments received from various big game hunters over the past couple years point to at least a perceived healthy lion presence in this LMU. Discussions with some local lion hunters and houndsmen indicate a decline in lion observations and harvest success the last couple years, especially towards the northern half of this LMU. In discussions with local houndsmen, a

reduction in the male quota will likely be met with general support, however status quo for the female quota will be met with some concern. To date, there have been limited contacts with landowners and lion depredation events on livestock are typically very low in this LMU.

Submitted by: Brent Lonner, Wildlife Biologist – Freezout Lake Office

Date: April 5, 2020

Approved: _____
Regional Supervisor / Date

Disapproved / Modified by: _____
Name / Date

Reason for Modification:

References:

MT. Fish, Wildlife & Parks. February 2019. Montana Mountain Lion Monitoring & Management Strategy. 139 pp.

Robinson, H., Ruth, T., Gude, J., Choate, D., DeSimone, R., Hebblewhite, M., Kunkel, K., Matchett, M.R., Mitchel, M., Murphy, K., and Williams, J. April, 2013. Linking Resource Selection and Mortality Modeling For Population Estimation of Mountain Lions in Montana. Final Report.

Robinson, H. S. and R. M. DeSimone. 2011. The Garnet Range Mountain Lion Study: Characteristics of a Hunted Population in West-Central Montana. Final Report, Montana Department of Fish, Wildlife & Parks, Wildlife Bureau, Helena, MT. 102 pp.

Williams, J. S. 1992. Ecology of Mountain Lions in the Sun River Area of Northern Montana. M.S. Thesis, Montana State University, Montana. 109 pp.

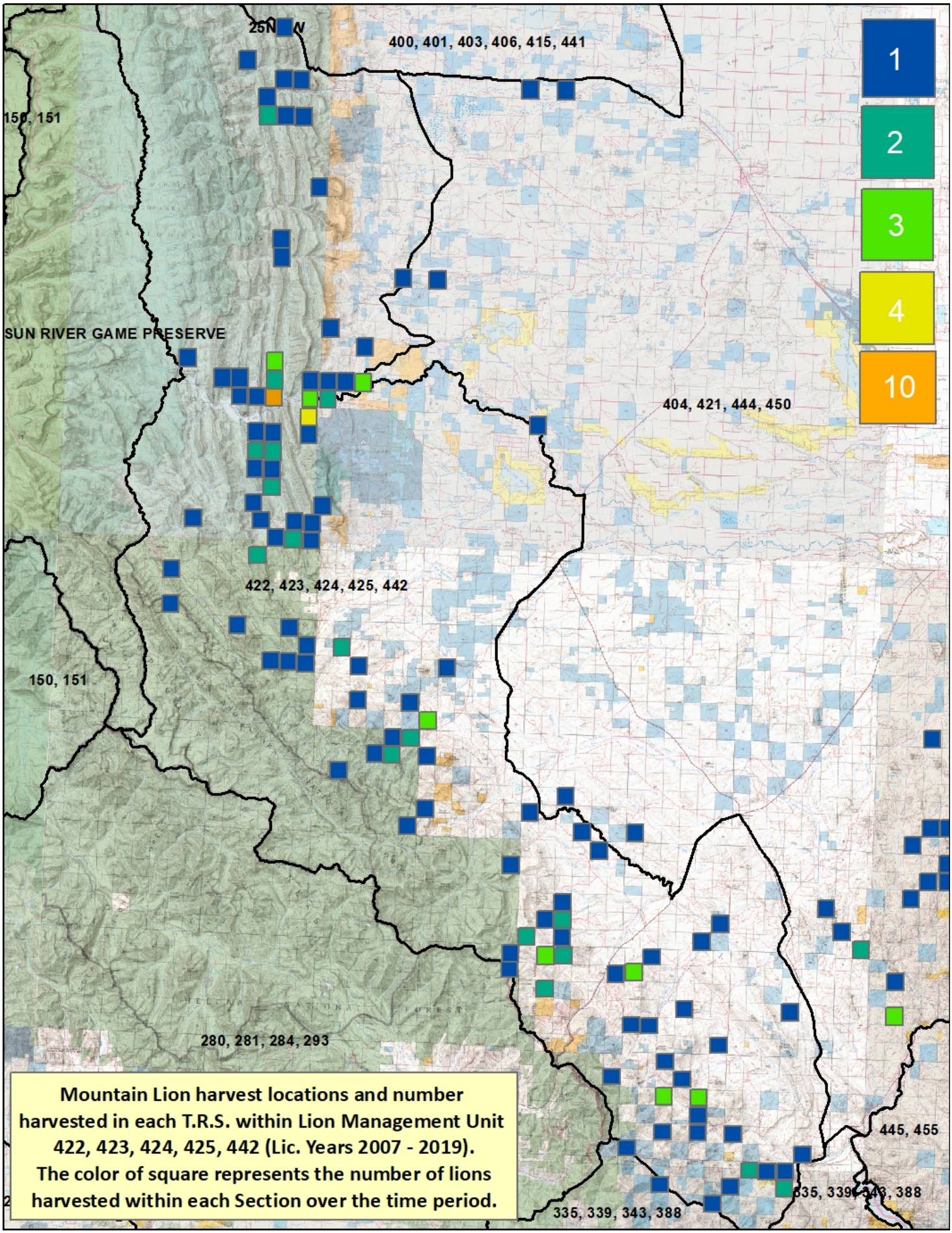

Figure 3. Lion management unit 422, 423, 424, 425 and 442 harvest locations.